

# Placenta Previa Percreta with Bladder Invasion: Ultrasound and MRI Findings

## Placenta Previa Percreta with Bladder Invasion

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### Abstract

Placenta previa percreta is an abnormal placental implantation due to decidual deficiency. Placenta previa percreta with invasion of the urinary bladder is an uncommon and serious condition if not recognized before delivery. We report color Doppler ultrasound (CDUS) and magnetic resonance imaging (MRI) findings in two cases of placenta previa percreta with bladder invasion. Both cases presented with sudden painless vaginal bleeding and had previous cesarean delivery. CDUS and MRI findings are helpful for the prenatal diagnosis of placenta previa percreta with invasion of the urinary bladder to prevent perinatal complications with this condition.

### Keywords

Color Doppler Ultrasound; Bladder Invasion; Magnetic Resonance Imaging; Placenta Percreta

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## Introduction

Abnormal placental implantation to the myometrium can be an important cause of maternal perinatal morbidity, and may be mortal if unrecognized previously. This abnormal placentation may occur in the presence of a decidual deficiency and myometrial invasion by chorionic villi [1]. Implantation anomalies include placenta accreta, increta and percreta; however, the most serious type of abnormal implantation is placenta percreta. The significant feature of placenta percreta is the invasion of the myometrium, uterine serosa and neighboring organs, such as the urinary bladder [1]. This condition can be difficult to detect without imaging [2]. Therefore, in this report, we present the color Doppler ultrasound (CDUS) and magnetic resonance imaging (MRI) findings in two cases of placenta previa percreta, with urinary bladder invasion.

## Case Report

### Case 1

A 34-year-old pregnant woman at 32 weeks of gestation, who had a history of previous cesarean delivery, presented with sudden painless vaginal bleeding. Placenta previa totalis was identified upon obstetric ultrasound examination, which showed the absence of myometrial tissue between the placenta and uterine serosa. The CDUS showed abnormal placental-bladder wall interface hypervascularity, linking the placenta to the bladder wall (Fig. 1). The diagnoses of placenta previa totalis (Fig. 2A) and placenta percreta with bladder invasion were confirmed by MRI. T2-weighted HASTE (half-Fourier single shot turbo spin echo) and TSE (turbo spin echo) images showed inhomogeneous signal intensity of the placenta, and there was no visible myometrial tissue at the previous cesarean scar adjacent to the bladder and the abdominal wall (Figs. 2B-D). Other MRI findings included a thick placenta with anterior abnormal uterine bulging. An emergent cesarean delivery and hysterectomy were performed. The diagnosis was confirmed by the operative and pathological findings.

### Case 2

A 33-year-old pregnant woman at 31 weeks of gestation, who had a previous cesarean delivery, with painless vaginal bleeding was referred to our radiology department for sonographic evaluation. The initial evaluation was performed by CDUS and showed a focal invasion of the placenta previa percreta to the bladder wall. The diagnosis of placenta previa totalis and placenta percreta with bladder invasion were performed and confirmed by MRI. T2-weighted HASTE MR images (Fig. 3) showed marked heterogeneity of the placenta with abnormal

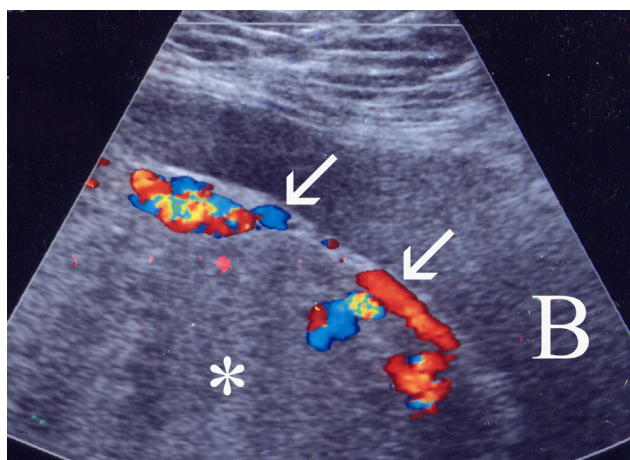


Figure 1. A 34-year-old woman at 36 weeks intrauterine gestation presented with vaginal bleeding. Sagittal color Doppler ultrasonographic image representing the placenta (\*) and urinary bladder (B) interface shows the absence of myometrial tissue between the placenta and uterine serosa, increased vascularization of the placenta-uterine serosal interface, and the presence of abnormal hypervascularity linking the placenta to the bladder wall (arrows).

bulging of the lower uterine segment, and focal interruptions in the hypointense myometrial wall adjacent to the urinary bladder. A cesarean hysterectomy was performed. The diagnosis was confirmed by the operative and the pathological findings.

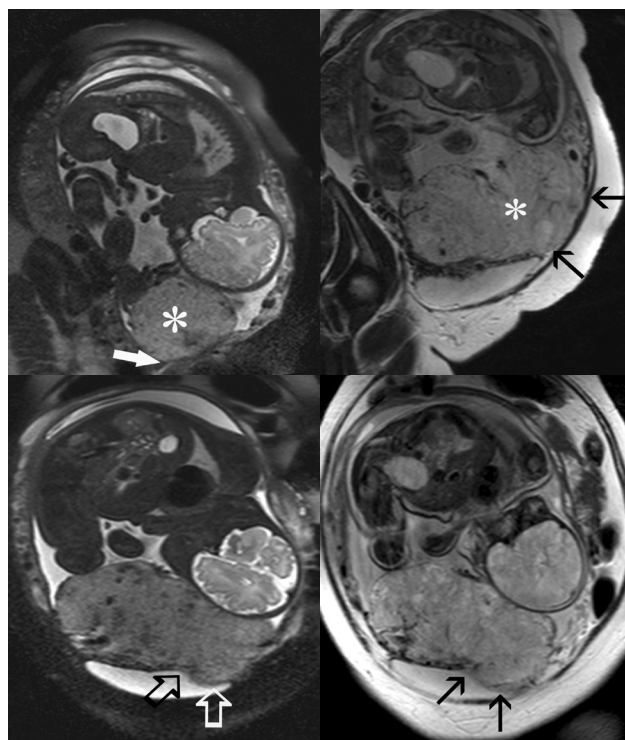


Figure 2. a-d. Sagittal T2-weighted HASTE (half-Fourier single shot turbo spin echo) magnetic resonance image (MRI) of the patient showing the placenta (\*) totally abutting the internal cervical os (arrow), consistent with placenta previa totalis (a). Sagittal T2-weighted HASTE MRI shows marked heterogeneity of the placenta (\*), abnormal bulging of the lower uterine segment (arrows), and no visible myometrial tissue at the anteroinferior region of the uterus between the placenta and abdominal wall (arrows) (b). Coronal T2-weighted HASTE (c) and TSE (turbo spin echo) (d) MR images showing the absence of visible myometrial tissue at the left anteroinferior region of the uterus between the placenta and the bladder wall (open arrows in c and black arrows in d). Note the small hypointense dots representing flow-void vascular structures which were not seen in this area (black arrows, d).



Figure 3. Coronal T2-weighted HASTE MR image showing focal interruptions in the hypointense myometrial wall adjacent to the urinary bladder (open arrow).

## Discussion

Here, we present the CDUS and MRI findings in two cases of placenta previa percreta with bladder invasion. Both of these patients had previous cesarean deliveries and were treated with cesarean hysterectomies. The diagnosis of placenta previa percreta is important to prevent perinatal morbidity and mortality. Our cases revealed that careful sonographic examination of the anterior uterine border and uterine-bladder interface are very helpful for the diagnosis of the placental invasion.

Placenta previa percreta with invasion of the urinary bladder is a rare but potentially fatal condition [3]. An ultrasonographic assessment of the cesarean scar is feasible with grayscale ultrasonography, and CDUS and T2-weighted HASTE magnetic resonance images can be useful for the prenatal diagnosis [4]. The presence of interface hypervascularity with abnormal blood vessels linking the placenta to the bladder on CDUS represents placenta previa percreta with urinary bladder invasion [5]. Moodley et al. [6] reported that CDUS has a 95% negative predictive value to identify abnormal placental implantation.

Abnormal implantation and placenta accrete can be seen in pregnancy after endometrial ablation [7]. The MRI has greater soft tissue contrast and a larger field of view according to ultrasonography, and it is beneficial if the placenta is not visualized on ultrasound because of the patient's body habitus or a posterior location of the placenta [1]. Palacios et al. [8] observed a prominent correlation between the MRI and surgical findings in patients with a high risk of placenta accrete. In the presence of placenta previa, uterine bulging and heterogeneous placental signal intensity can be seen. In addition to these findings, focal interruptions in the hypointense myometrial border upon MRI examination can resemble placenta previa percreta with urinary bladder invasion.

In conclusion, careful gray scale and color Doppler ultrasound evaluations of the anterior uterine border, uterine-abdominal wall and bladder-uterine interfaces are very helpful for the diagnosis of placenta percreta and bladder invasion. This diagnosis should be confirmed by MRI.

## Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

## Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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## Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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